cholamines such as dopamine. Although the mechanism of action is similar to that of cocaine, some sites of action differ, and the half-life of amphetamine-induced euphoria is four to eight times longer than that of cocaine. Methamphetamine can be easily synthesized from ephedrine with inexpensive equipment. The end product of this synthetic process is a white to brown powder that can be snorted, smoked, injected, or swallowed. Because the synthesis process is usually clandestine, however, the product may contain a number of impurities. Such impurities can include toxic concentrations of lead, complex organic compounds that may be carcinogenic, or numerous amphetamine-related compounds.

Symptoms of acute intoxication are variable and can include hyperexcitability, confusion, hallucinations, and tachycardia. In severe cases, seizures and occasionally death have occurred. Amphetamines may produce a state mimicking paranoid schizophrenia and induce agitation and violence. In San Diego County in 1986, 40% of all homicides were methamphetamine related; cocaine was involved in 12% to 15%. This represented a 52% increase in methamphetamine involvement over the previous year. In San Bernardino County, the number of coroner's cases involving amphetamines is twice that of cocaine. Some emergency departments treat twice as many amphetamine-related problems as those of cocaine.

The treatment of an acutely intoxicated amphetamine patient should be directed toward ensuring an adequate airway and other supportive measures. Agitation should be controlled with the use of haloperidol, and cardiovascular hyperactivity responds to propranolol hydrochloride administration. Both of these drugs have been established as effective amphetamine antagonists in studies of animals. Although other agents such as diazepam have been used with success clinically, there are no controlled studies to validate their efficacy.

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Hydrofluoric Acid Burns of the Hand

HYDROFLUORIC ACID is one of the most dangerous acids found in the workplace. Unlike other corrosives, a considerable amount of hydrofluoric acid remains undissociated when dissolved in water. In this uncharged state, it can penetrate deeply into tissues. Injury is mainly due to the interaction between fluoride and calcium, disrupting calcium-dependent processes and producing deep tissue necrosis and severe pain. This unique injury does not respond to standard burn therapy. Instead, current treatment involves applying calcium or magnesium after decontaminating by copious water irrigation. The choice of vehicle and the technique of administration depend on several factors: the surface area involved, the concentration of hydrofluoric acid, and the duration between exposure and treatment.

A minor burn is defined as an injury involving a few square centimeters of tissue (sparing the nail and nailbed), contact with a hydrofluoric acid concentration of less than 20%, and treatment soon after exposure. Treatment consists of bathing the hand in a 10% to 25% solution of magnesium sulfate and massaging the burn with a 2.5% calcium gluconate gel for at least 30 minutes. If pain persists after one to two hours of this therapy, the injured area is cautiously injected with a 10% calcium gluconate solution using a 27-gauge needle. The area infiltrated should extend 5 mm beyond the burn edge. A dose of 0.5 ml per cm^2 of involved tissue is recommended. For digital burns, no more than 0.5 ml per phalanx should be injected to avoid pressure necrosis.

A more aggressive approach is required for exposures involving hydrofluoric acid concentrations of greater than 20%, tissue contamination of more than a few square centimeters, or a long delay between contact with any concentration of hydrofluoric acid and treatment. Here, deep tissue injury is likely, and ointments or solutions cannot diffuse far enough to be effective. The initial management consists of calcium gluconate infiltration as described earlier. If the nailbed is affected, the nail must be removed before the calcium gluconate can be administered. Any bullae or necrotic tissue must be debrided.

In severe burns, those involving large areas of the hand, or if more than one nailbed is contaminated, infiltration with calcium gluconate becomes impractical. Instead, an intraarterial infusion of calcium gluconate is the treatment of choice. A radial arterial line is established using a standard aseptic technique. Two grams of calcium gluconate are dissolved in 200 to 250 ml of a normal saline solution and infused by pump over four hours. The line is then maintained with heparinized saline for four to six hours. Should typical hydrofluoric acid pain return during this period, the patient is re-treated. After the second infusion, if avascular-appearing tissue remains, conservative debridement is carried out. This may include nail removal if the nailbed does not show improvement. This process continues until the patient is pain-free.

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Prehospital Intubation of Trauma Patients

ESTABLISHING AN AIRWAY is the foremost priority in resuscitating any acutely injured patient. Most blunt trauma victims who require airway intervention have either sustained a major head injury or have respiratory distress due to thoracic trauma or hypovolemic shock. Establishing an airway in these patients can be lifesaving by alleviating hypoxia, lowering the intracranial pressure, and preventing aspiration.

Although there has been a trend in the prehospital setting to "scoop and run" with these patients, limiting the prehospital time expended, there is evidence that airway intervention in the field may increase survivability. Unfortunately, the need for establishing an airway in the field for a blunt trauma victim poses a dilemma to prehospital care providers. Although orotracheal intubation may be lifesaving, it has long been taught that this technique may induce or exacerbate a spinal cord injury in a patient with an unstable cervical spine.

Despite this belief, there are a number of trauma systems successfully using orotracheal intubation with "in-line stabilization" of the head and neck in blunt trauma patients both prehospital and inhospital. In-line stabilization of the neck has been proposed as a protective measure against motion of an unstable cervical spine during orotracheal intubation. Although mounting experiential evidence supports the effectiveness of the technique, there is no scientific evidence that in-line stabilization affords any protection for an unstable spine during intubation. For this reason, alternatives to orotracheal intubation are being used in many emergency medical systems nationally.

The esophageal obturator airway is the most widely used alternative that can be placed without neck manipulation and with little training. Despite years of experience, however, there is mounting evidence that as used in the field, ventilation and oxygenation are suboptimal. Both nasotracheal intubation and cricothyrotomy are being used in the prehospital setting in several major cities, but there has been little published on their practicality in that setting.

Other promising new airway adjuncts being studied include the pharyngotracheal lumen airway and the lighted-stylet guide for orotracheal intubation. Each of these appears to show promise, but, again, more clinical trials are necessary in the prehospital setting, and their effects on cervical spine mobility need to be clarified.

In the final analysis, until an effective alternative to orotracheal intubation can be developed and field tested, the risk of prolonged hypoxia, intracranial hypertension, and aspiration far outweighs the risk of inducing a spinal cord injury in these already critically injured patients. Until then, the judicious use of orotracheal intubation with in-line stabilization under tight medical control appears to be as safe and effective as any method for establishing an airway in critically injured patients in the prehospital setting.

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